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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/362,521      | 07/28/1999  | YUNZHOU LI           | 10360/027001        | 6953             |

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DENIS G MALONEY  
FISH & RICHARDSON PC  
225 FRANKLIN STREET  
BOSTON, MA 021102804

EXAMINER

PRIETO, BEATRIZ

ART UNIT

PAPER NUMBER

2142

DATE MAILED: 11/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/362,521 ✓

Applicant(s)

LI, YUNZHOU

Examiner

B. PRIETO

Art Unit

2142

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 10/09/02.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-7,9-13,15-20 and 22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-13,15-20 and 22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

***DETAILED ACTION***

1. This communication is in response to amendment filed 10/09/02, claims 1-7, 9-13, 15-20, and 22 remain pending and are set here forth for examination.
2. Quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action may be found in previous office action.
3. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crowley et. al. (Crowley) U.S. Patent No. 5,881,246.

Regarding claim 1, Crowley teaches features of the invention substantially as claimed, teaching receiving link state (advertisements) from routers in a network (col 1/lines 13-20, 27-43, 56-63); and

constructing a routing table (database topology of (link-state advertisement (LSA) broadcast, i.e. from routers in network area) from the received link state (advertisement) packets, the table corresponding to a short path tree through unicast routers (OSPF: col 1/lines 27-43, database of the network topology using a link state routing topology, i.e. unicast group members), constructing an unicast routing table from the received link state advertisements (Haggerty: col 10/lines 56-col 11/line 19);

and constructing an added new routing table (database topology of (link-state advertisement (LSA) broadcast, i.e. from routers in network area) from the received link state (advertisement) packets, the table corresponding to a short path tree through multicast routers (MOSPF: col 1/lines 56-col 2/line 11);

however Crowley teachings of a routing table constructed based on the broadcast link-state advertisement packets between routers in multicast group and unicast group in a network area is not explicitly denoted "multicast routing table" and "unicast routing table";

It would have been obvious at the time the invention was made to implement prior art teaching to perform the same functions as claimed, motivation would be to implement a routing

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system for reducing routing calculations and thereby reduce the resources for storing, network advertisements necessary for routing calculations, as taught by Crawley.

4. Claim 2-7, 9-13, 15-20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crawley et. al. (Crawley) U.S. Patent No. 5,881,246 in view of Haggerty et. al. (Haggerty) U.S. Patent No. 6,331,983.

Regarding claim 2, however the prior art discussed above, does not explicitly teach performing reverse path forwarding using the multicast routing table;

Haggerty teaches receiving a from routers members of a multicast group and transmitting said received packet to all routers connected to the receiving router's outgoing tree links and dropping those packets that are destined to routers that are not connected to receiving router's outgoing tree links (i.e. reverse path forwarding), based on knowing the members of its tree branch (col 6/lines 12-30, transmission paths for forwarding messages is performed using data recorded in the routing tables: col 5/lines 46-51, 56-65, multicast-enabled routers, col 11/lines 60-col 12/line 5).

It would have been obvious to one ordinary skilled in the art at the time the invention was made to incorporate the means for performing reverse path forwarding using the multicast routing table, motivation would be dynamically update said enabling each multicast router to multicast packets based on its routing table including connection table entry, as taught by Haggerty.

Regarding claim 3, the link state advertisements comprise OSPF (Open Short Path First) link state advertisements (Crawley: col 5/lines 3-11, 20-37).

Regarding claim 4, the link state advertisements comprise MOSPF (Multicast Open Short Path First) link state advertisements (Crawley: col 5/lines 3-11, 20-37, Haggerty: col 6/lines 31-43).

Regarding claim 5, constructing the multicast routing table comprises determining if a router is a multicast router (Haggerty: col 6/lines 12-22) of a predetermined multicast group.

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Regarding claim 6, wherein constructing the multicast routing table comprises using Dijkstra's short path algorithm (Crawley: col 4/lines 31-38).

Regarding claim 7, wherein the multicast routing table correlates addresses of destination multicast capable routers with addresses of multicast capable routers on a short path tree of multicast capable routers (Haggerty: col 6/lines 12-30).

Regarding claim 9, wherein using the multicast routing table comprises configuring PIM (Protocol Independent Multicasting) to use the multicast routing table (Haggerty: col 6/lines 31-55, dense or sparse groups, col 14/lines 55-col 15/line 9).

Regarding claim 10, wherein configuring comprises providing a routine for a Protocol Independent Multicasting (PIM) Reverse path forwarding (RPF) Check function (Haggerty: col 14/lines 66-col 15/line 9. col 18/lines 4-18).

Regarding claim 11-12, wherein PIM uses the multicast routing table to perform reverse path forwarding in sparse mode and to perform reverse path forwarding in dense mode (Haggerty: col 14/lines 55-col 15/line 9).

Regarding claim 13, comprising limitations of claims 1-2, 4, and 11-12 discussed above, same rationale is applicable; receiving link state (advertisements) from routers in a network (col 1/lines 13-20, 27-43, 56-63); and

constructing a routing table (database topology (addresses) of (link-state advertisement (LSA) broadcast, i.e. from routers in network area) from the received link state (advertisement) packets, the table corresponding to a short path tree through unicast routers (OSPF: col 1/lines 27-43, database of the network topology using a link state routing topology, i.e. unicast group members),

and constructing an added new routing table (database topology of (link-state advertisement (LSA) broadcast, i.e. from routers members of a multicast group in network area, distributing datagrams to multiple destination addresses) from the received link state

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(advertisement) packets, the table corresponding to a short path tree through multicast routers (MOSPF: col 1/lines 56-col 2/line 11).

Regarding claims 15-16, these claims are substantially the same as claims 3 and 11-12, respectively, same rationale is applicable.

Regarding claim 17, this claim is the computer program product disposed on a computer readable medium, for multicast routing the computer program including instructions for causing a computer to perform the method disclosed on claim 1, same rationale is applicable.

Regarding claims 18-20, these claims are the computer program product disposed on a computer readable medium, for multicast routing the computer program including instructions for causing a computer to perform the method of claims 2, 4, and 7, respectively same rationale is applicable.

Regarding claims 20-22, these claims this claim is the computer program product disposed on a computer readable medium, for multicast routing the computer program including instructions for causing a computer to perform the method of claims 9 and 11-12, same rationale is applicable.

5. Applicant is urged to review the claims language for the misspelling of "capable".

**Citation of Pertinent Art:**

6. Prior art made of record and not relied upon is considered pertinent to applicant's disclosure; Copies of documents cited will be provided as set forth in MPEP§ 707.05(a):

A. Multicast routing extensions of OSPF: Moy, J., Proteon, Inc., Westborough, MA, ACM Periodical-Issue-Article, ISSN:0001-0782, 1994, pages 61-67.

Moy teaches performing reverse path forwarding using multicast and unicast databases, link-state advertisements (LSA) routing protocols such as comprising OSPF (a unicast routing protocol), MOSPF (a multicast routing protocol) an extension of OSPF, reverse path forwarding

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in sparse mode and dense mode, multicast routing tables comprising PIM to use the routing table. OSPF and MOSPF which is an extension of OSPF which adds new types of LSA generate a dynamic map of the internetwork, which is essentially a link state database containing the group-membership LSA that describes the location of multicast groups in the OSPF Autonomous system.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prieto, B. whose telephone number is (703) 305-0750. The Examiner can normally be reached on Monday-Friday from 6:00 to 3:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's Supervisor, Mark H. Rinehart can be reached on (703) 305-4815. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-6606. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3800/4700.

Any response to this final action should be mailed to:

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**or Faxed to:**

(703) 746-7238 for TC 2100 Official After-final communications; please mark "EXPEDITED PROCEDURE", and  
(703) 746-7239 for other TC 2100 Official communications.

**or:**

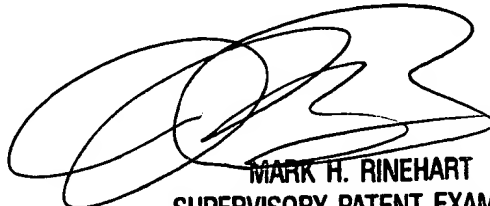
(703) 465-7240 for Non-Official, Draft communications, status query, please label "PROPOSED" or "DRAFT".

**Or Telephone:**

(703) 306-5631 for TC 2100 Customer Service Office Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

(BP)

B. Prieto  
GAU 2142/TC 2100  
Patent Examiner



MARK H. RINEHART  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100